



STOPPING THE FLAMES

SUBJECTS: English/Language Arts, Science, Health, Physical Education, Vocational Studies, Careers

GRADES: 4-8

DURATION: one class period

GROUP SIZE: one class of 25-30 students

SETTING: Outdoors or Indoors

KEY VOCABULARY: Grid, fire, flame, spot fires, firefighter, strategy

ANTICIPATORY SET: When firefighters attempt to contain a wildland fire they use strategies which will help them eliminate fuels and thus stop the spreading flames. Today you will play a version of the oriental game "GO". This game has similar strategies. As you play the game, will your decisions stop the spread of fire or will the fire overtake your area?

OBJECTIVES: To understand the strategy involved in fighting fires and to practice making sound decisions.

MATERIALS:

- *For outdoor activity:* chalk or flagging tape to mark a grid on the ground; red ribbons (bandanas, lengths of material, etc.) to designate "fire"
- *For indoor activity:* Checkerboard and 64 small markers (32 red and 32 black paper circles, checkers, small cubes, or colored rocks)

BACKGROUND: Fire can be unpredictable. When fighting fires in wilderness areas, a team of men and women works behind the scenes to watch for changing weather conditions, to procure the best equipment available, and to provide the safest working conditions possible for firefighters. Firefighters themselves must always be on their guard to ensure that they are not trapped by flames. While trying to save natural resources, the first priority of any firefighting team is always the safety of people. Protection of property is the second priority. This was not always the case. During the turn of the century, firefighters made saving trees their first priority, sometimes with disastrous results. One fire changed public opinion and brought about new rules and methods of safety.

It has been estimated that long before the western half of the United States was settled, cyclic fires burned as much as 13 million acres per year. Some of these fires were set by native Indians who wished to maintain prairie and savanna lands for game. Most of these fires were naturally occurring, usually started by lightning strikes on dry fuels.

By the 1850's, early settlers were beginning to populate these western lands. As many of these pioneers were of European descent, they brought with them an attitude of fire suppression. In Europe, fires could destroy already depleted forests, and fires were always put out. However, Europe had a much wetter climate than that found in the western United States, so fires in Europe weren't really a problem. The situation was very different in the drier American west. Settlement and fire suppression eventually resulted in a build-up of forest fuels in the western states.

The summer of 1910 was hot and dry. The newly formed Forest Service had hired thousands of men to fight these lightning strike fires as they were started. By the end of the summer there were more fires than firefighters. Then, on August 20th, hurricane-force winds in Idaho and Montana pushed the previously moderate intensity fires towards each other. The result was a fire so large and so hot that it altered regional weather patterns. A weather forecaster in Denver, Colorado (800 miles away) reported that in only 10 minutes, winds in Denver increased to 42 mph, the temperature changed by 19 degrees and the winds encased his town in smoke from the distant fires!



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It was later estimated that the fire burned 4,700 square miles in only two days! The fire was stopped by a very welcomed rain/snow storm.

When the winds came, men were scattered throughout the forests of Idaho and Montana. These men found themselves trapped by flames no matter which direction they rode. The only places they could run for safety were either in mineshafts or by soaking themselves and laying down in streams or rivers. Citizens of small towns lit backfires or fled by train.

Edward Pulaski, who was in charge of 150 firefighters, told one dramatic story. He wrote: "On August 20, a terrific hurricane broke over the mountains... The wind was so strong it lifted men out of their saddles. The smoke and heat became so intense that it was difficult to breathe. Under such conditions, it would have been worse than foolhardy to attempt to fight the fire. I got on my horse and went where I could, gathering my men."

He managed to gather and lead 45 of his men into a mine shaft. Once inside, however, Pulaski was forced to use his six-shooters (guns) to keep his frightened men there! Pulaski stayed up all night keeping the timbers that held the mine up from burning and preventing his men from leaving. Because Pulaski was there to direct and organize his men, they were not among the 78 firefighters who died.

Pulaski later invented a tool that still carries his name. It has an axe on one end and a grubhoe (for digging) on the other. The Pulaski is still used in modern fire line construction!

The fires of 1910 caused drastic changes in Forest Service policy. Because everything had burned and so many people had lost their lives, new policy demanded complete suppression. Every single fire was to be put out by 10:00 AM the next morning. This "10 o'clock rule" remained in effect until forest managers began to realize that fire was an integral part of the forest cycle. Small fires kept fuel levels under control and assisted with reproduction of many plant species. Fires also indirectly helped animals by improving their habitat conditions and increasing food supplies.

By 1968, a new attitude became prevalent. Prescribed burns were a way to retain fire within the wilderness without the destructive properties of a large, hot, out-of-



control inferno. Today we realize that fire is a natural and integral part of the landscape. The trick is to balance the need for fire with the need for safety - of both people and property. This lesson looks at ways firefighters can remain safe while battling a large wildland fire.

PROCEDURE:

This activity follows the rules for the oriental game of "Go". In this game, pieces are played on the intersections of any two lines. Do NOT use the open squares. Teachers may find three Internet sites of assistance: www.sentex.net gives simplified instructions on how to teach the game to students

In the classroom, let students practice at one of these two interactive sites:

<http://playgo.to/interactive/remove.html> teaches the game in a step-by-step format

http://kgs.kiseido.com/en_US/tutorial/1.html teaches game concepts

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For outdoor play:

Preparation:

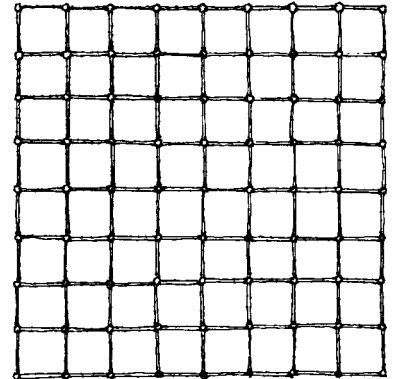
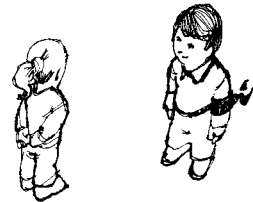
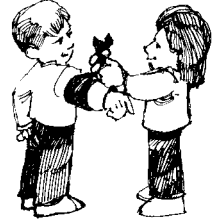
- Choose an open space at least 20' by 20'. Draw a grid on the ground containing 9 lines horizontally by 9 lines vertically. Lines should be 30" apart. Divide students into two teams. Give one team red ribbons to wear. This will designate them as flames. Designate one member of this team to be the "Lead Flame". The second team will be the firefighters. Designate one member of this team to be the "Fire Manager". The "Lead Flame" and the "Fire Manager" will control the movement of members of their respective teams.

The Objective:

- The lead flame begins the play by placing one of his resources (a flame) on any intersection of the playing field. This starts a wildland fire. The fire manager wants to contain the fire by surrounding it with four of his firefighters. But if he is not careful, his firefighters may become surrounded by fire! The team with the greatest number of players at the end of the game is the winner.

The Rules:

- Movement around the field must follow the grid lines. Players are placed on and can only stand on the intersection of two lines.
- Fire Managers and Lead Flames alternately bring in one resource at a time from their reserve-pool area and place this resource on any intersection. Fire always goes first.
- New resources brought into play may be placed on any open intersection. Players placed on the grid lines may not be moved until all "reserve" players have been placed.
- Flames or firefighters can be captured if members of the opposite team occupy the four intersections ahead of, behind, to the right, and to the left of the individual. [NOTE: Students located along any edge of the playing field are assumed to be "surrounded" by the opposite team along the open sides of the grid. Thus, students standing on the intersections along the edge of the grid only need to be surrounded on three sides. Students located on a corner only need to be surrounded on two sides.]
- Groups of flames or groups of firefighters can be captured if all intersections surrounding the group are occupied by members of the opposite team.
- Captured students become members of the capturing team and join their reserve group along the sidelines. For example, if a flame is surrounded by firefighters, the encircled flame leaves the grid, removes their red ribbon, and becomes a reserve firefighter.
- Only after all players have been brought in to play can players already on the grid be moved. Players may only move to the next adjacent, open intersection. Players may not cross open squares.
- After a predetermined time, or when there are no plays left, the team with the most players is declared the winner.



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The Play:

- The lead flame always begins the game by placing one of his fire players (flames) on the intersection of two lines anywhere on the playing field. This starts a wildland fire. The fire manager tries to block the spread of the wildfire by placing one of his players anywhere on the field. Play alternates between the two team leaders.
- The fire manager must decide whether to position his players around a single flame or around a larger fire (group of flames). To stop a large fire, all open intersections around the block of flames must contain a firefighter. The fire manager must keep an eye on changing fire conditions and be ready to move his/her resources as necessary.
- The Lead Flame has several options. He/she can have their fire spread like a long chain of flames, thus making it harder for the firefighters to contain. He/she can group their blazes in a large circle, thus making it difficult for the firefighters to encircle. Or they can send out single "spot" fires in an attempt to divide the attention of the fire manager and to spread the firefighter resources as thin as possible.
- Firefighter managers try to surround the flames by placing one firefighter on each intersection surrounding the flame. If the fire is large (several flames grouped together), the firefighter manager would need to station one firefighter on every intersection surrounding the larger blaze. But beware, fire may also surround firefighters!
- Both sides try to surround members of the opposite team thus adding them to their own reserve-pool. New players are positioned onto the field by turns until all resources in the reserve pool have been used up. At this point, resources (firefighters and/or flames) may be moved to new locations on the field. Resources can only move one space and only if there is an open intersection next to them.
- Play continues until one side is able to completely surround and eliminate all players from the opposite side, or until a pre-determined amount of time has passed.

For indoors:

- Use a checkerboard. Play is conducted on the intersections of any two lines. Do NOT use the open spaces. Play will alternate between the red and the black side. Red represents the fire and always goes first. Black represents the firefighters.
- Place one red marker at the intersection of two lines. This is the beginnings of a fire. The opposite team places one black marker on the intersection of two lines. This will be the beginnings of their fireline. Play continues as above, however, once played, markers must remain in the original spot and may not be moved.
- The game ends when one team is captured or until there are no moves left on the board.

CLOSURE: Fire can be unpredictable and firefighters must always be alert to ensure their own safety and the safety of homes and businesses. In this activity, were the firefighters able to anticipate the movements of the flames? Were any firefighters taken out of the game? Could this happen in real life?

EVALUATION: The teacher will be able to evaluate student's ability to think, to respond to changing conditions, to work together as a team, to react to changing conditions during the game, and to play fairly.

EXTENSIONS:

1. How can firefighters stay safe if they are surrounded by fire in the wilderness? Over the years, scientists have worked hard to produce equipment designed to save lives. The most important item a wildland firefighter can carry with him/her is a fire shelter. A firefighter can get inside this lightweight tent of fiberglass and aluminum when there is a danger of becoming trapped by flames. The fire shelter reflects radiant heat and can reduce the deadly 1,000-degree heat given off by a raging wall of flame to a survivable 120 degrees. This cocoon of safety also provides a temporary pocket of breathable air in a fire-entrapment situation. This can mean the difference between life and death. Wildland firefighters practice deploying their fire shelters on a regular basis. While they hope to never need to use one, firefighters would rather be prepared than in trouble!

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Allow your students to examine a practice fire shelter from the Fire Box. Allow students to practice deploying a fire shelter. Can they open their shelter, station themselves safely inside, and be ready for a raging fire in 50-seconds or less? Use a stopwatch to time them. Then simulate a strong fire wind by shaking the top of the shelters. Did the tent "blow away" or stay in place? Did the student "survive"?